

CLAIMS.

1. A method method for characterising an extrudate flowing under the die tooling that comprises the steps of:

- 5 - providing one vertically moving laser or several vertically aligned lasers that detect the lower edge of the extrudate exiting the die and that emit successive digital signals upon detection of said lower edge;
- 10 - providing a micro controller that receives the successive digital signals from the vertically moving laser or from the several vertically aligned lasers;
- 15 - providing a flash that is activated by the micro controller;
- 20 - providing a camera equipped with a CCD sensor that is activated by the micro controller and that is synchronised with the flash;
- 25 - recording the time at each step;
- 30 - recording the digital information at each step;
- 35 - providing a software that instantaneously calculates the equation for the combined swell and sag curve of the extrudate and instantaneously separates the sag and swell components.

2. The method according to claim 1 wherein the CCD sensor is a two-phase charge-coupled sensor with a transparent electrode.

3. The method according to claim 1 or claim 2 wherein the one vertically moving laser is operated with a speed of up to 2 m/s with an accuracy of the order of the mm.

25 4. The method according to any one of the preceding claims wherein the flash duration is at most 1/9100 sec.

30 5. The method according to any one of the preceding claims additionally comprising the step of providing a feedback software for adjusting the production parameters of die design, temperature and shear rate.

6. The method according to any one of the preceding claims wherein the extrudate is polyethylene or polypropylene.
7. The method according to claim 6 wherein the extrudate is polyethylene.
- 5 8. Use according to any one of the preceding claims of one or three cameras equipped with a charge-coupled device (CCD) sensor and of laser detectors for characterising respectively in two or three dimensions, the behaviour of an extrudate at the exit of a die, said CCD camera(s) being synchronised with a flash by the laser detectors.
- 10 9. Use according to claim 8 to calculate separately the swell curve and the sag curve of an extrudate.
- 15 10. Use according to claim 8 to detect incipient melt fracture in an extrudate.
11. Use according to claim 8 to calculate the relaxation time of an extrudate.
12. Use according to any one of claims 8 to 11 wherein the extrudate is
- 20 polyethylene.

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